

CLAIMS

5 1. A carbonaceous protective layer for protecting an underlying material, which is a layer formed by a Filtered Cathodic Arc process, and contains nitrogen distributed therein.

2. A carbonaceous protective layer according to claim 1, wherein a nitrogen content of said carbonaceous protective layer is 2 to 20 at%.

10 3. A carbonaceous protective layer according to claim 1, wherein nitrogen is distributed in an inclined concentration in said carbonaceous protective layer, and a nitrogen concentration is gradually increased from a bottom surface side to a top surface side in said carbonaceous protective layer.

15 4. A carbonaceous protective layer according to claim 1, wherein nitrogen is not contained in a substantially lower half portion, occupying substantially one half of the thickness-wise distance from a bottom surface of said carbonaceous protective layer.

20 5. A carbonaceous protective layer according to claim 1, wherein a hardness of said carbonaceous protective layer is at least 18 GPa.

25 6. A carbonaceous protective layer according to claim 1, wherein a contact angle of said carbonaceous protective layer to water is not greater than 35°.

7. A carbonaceous protective layer according to any one of claims 1 to 6, wherein said carbonaceous protective layer is positioned over a magnetic recording layer of the magnetic recording medium.

30 8. A magnetic recording medium comprising a non-magnetic substrate having applied thereon a magnetic recording layer, in which said magnetic recording layer has a carbonaceous protective layer formed thereon by a Filtered Cathodic Arc process, and said carbonaceous protective layer contains nitrogen distributed therein.

35 9. A magnetic recording medium according to claim 8, wherein a nitrogen content of said carbonaceous

protective layer is 2 to 20 at%.

10. A magnetic recording medium according to claim 8, wherein nitrogen is distributed in an inclined concentration in said carbonaceous protective layer, and
5 a nitrogen concentration is gradually increased from a bottom surface side to a top surface side in said carbonaceous protective layer.

8/27/11 11. A magnetic recording medium according to claim 8, wherein nitrogen is substantially not contained in a
10 lower half portion, occupying substantially one half of the thickness-wise distance from a bottom surface of said carbonaceous protective layer.

12. A magnetic recording medium according to claim 8, wherein a hardness of said carbonaceous protective
15 layer is at least 18 GPa.

13. A magnetic recording medium according to claim 8, wherein a contact angle of said carbonaceous protective layer to water is not greater than 35°.

14. A method of producing a magnetic recording
20 medium comprising a non-magnetic substrate having applied thereon a magnetic recording layer, which has a carbonaceous protective layer deposited thereon, which method comprises the step of depositing said carbonaceous protective layer on said magnetic recording layer by a
25 Filtered Cathodic Arc process, while introducing nitrogen into said carbonaceous protective layer.

15. A method of producing a magnetic recording medium according to claim 14, wherein nitrogen is
30 introduced in said carbonaceous protective layer under the conditions that a nitrogen concentration is gradually increased from a bottom surface side to a top surface side in said carbonaceous protective layer.

16. A method of producing a magnetic recording medium according to claim 14, wherein nitrogen is
35 introduced in said carbonaceous protective layer under the conditions that nitrogen is substantially not contained in a lower half portion, occupying

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substantially one half of the thickness-wise distance from a bottom surface of said carbonaceous protective layer.

5 17. A method of producing a magnetic recording medium according to any one of claims 14 to 16, wherein said carbonaceous protective layer is deposited under irradiation of a nitrogen ion beam, or under the application of a nitrogen atmosphere or by combining them together, thereby introducing nitrogen into said
10 carbonaceous protective layer.

15 ~~18. A magnetic disk apparatus comprising a recording head for recording information and a reproducing head for reproducing information to and from a magnetic recording medium, in which said magnetic recording medium comprises a non-magnetic substrate having applied thereof a magnetic recording layer, and said magnetic recording layer has a carbonaceous protective layer, formed thereon by a Filtered Cathodic Arc process, which contains nitrogen distributed therein.~~

20 ~~19. A magnetic disk apparatus according to claim 18, wherein nitrogen is distributed in an inclined concentration in said carbonaceous protective layer, and a nitrogen concentration is gradually increased from a bottom surface side to a top surface side in said carbonaceous protective layer.~~

25 ~~20. A magnetic disk apparatus according to claim 18, wherein nitrogen is substantially not contained in a lower half portion, occupying a substantially one half of the thickness-wise distance from a bottom surface of said carbonaceous protective layer.~~
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